approach

NOVEMBER 19[illegible] THE NAVAL AVIATION SAFETY REVIEW

The Mk-4 antiexposure suit was the Navy's first approach to cold water protection.

ANTIEXPOSURE

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THE general subject of cold water exposure protection for Navy crewmen is a repetitive one. Every few years the issues involved seem to resurface, even after much effort is made to resolve them. Last month's article, "The *Ventile* Antiexposure Suit," was typical. Why does this subject continue to harass us, and more important, what can be done to finally put it to rest?

The need for antiexposure protection became imperative during the Korean War. Crewmen who were downed over the icy waters of that combat area soon learned the fatal consequences of exposure to 35-45°F water without any form of thermal protection.

The word soon got back to the cognizant technical agency, the Aero Medical Equipment Laboratory (now the Crew Systems Department of the Naval Air Development Center), and they responded immediately. A dedicated team of specialists combined their talents to develop the Navy Mk-4 antiexposure suit. This consisted of a rubber-coated outer garment to provide dryness, and a quilted undergarment to add insulation against cold. The outer garment also featured elasticized neck and wrist seals to prevent water from entering at those openings. The trouser endings were permanently cemented to insulated rubber boots.

After the initial acceptance of the Mk-4 wore off, the attitude toward the Navy's first antiexposure suit became less than enthusiastic. Complaints were heard concerning the overall bulk of the two-layer assembly. The elasticized wrist and neck seals were maddeningly uncomfortable, driving a few users so far as to trim the openings to a "comfortable" size (comfortable enough to render it useless in water).

The biggest flaw was the coating. It peeled excessively in the areas of greatest wear, namely at the knees, elbows, and crotch. It was apparent that a successor to the Mk-4 was

The Mk-5 succeeded the Mk-4, but shortage of ventilating equipment resulted in extreme pilot discomfort.

THEN

needed, and with the pressure of the Korean War now over, a new developmental effort was begun.

The new design efforts centered around stretch knit fabrics. The final garment design was designated Mk-5 and possessed such features as a waterproof, zippered neck seal (kept open during flight) and a waterproof, zippered entry for donning and doffing. The coating of the cloth was impermeable, and in order to prevent a buildup of body moisture within the suit, a ventilating system was incorporated as an integral part of an insulating liner.

The early response to the Mk-5 was good, but after a while, discontent began to build. The Mk-5 design depended on a ventilation air source to produce comfort within the suit. For the aircraft that did not have the necessary air sources, auxiliary blowers were procured for installation. It appeared that many of the blower installations did not materialize, and as a result, many of the Mk-5 assemblies were worn without the much needed ventilation. Discomfort was inevitable. This, coupled with

The Ventilated Wet Suit replaced the Mk-5. Its bulk, restrictiveness, and warmth made it unpopular with pilots.

...AND NOW

supply shortages of the suit, led to an increasing demand for "something new."

Before continuing our story of what followed, it might be well to digress for a moment. During the early developmental days of the Mk-5 (circa 1955-57), a British antiexposure suit constructed of a material called *Ventile* fabric was brought to the NADC (Naval Air Development Center) attention. *Ventile* was advertised as an Egyptian cotton fabric that became impervious to water penetration by the swelling of its fibers when wet. Sample garments were procured and subjected to tests with live subjects. From a comfort and bulk standpoint, the *Ventile* suit was an improvement over the Mk-4.

Water-test results were inconsistent – ranging from total dryness within some suits to varying degrees of leakage in others. After much testing, several garments, which incidentally consisted of two complete layers of *Ventile* material, were disassembled to examine the inner construction. It was found that large rubber patches had been cemented to the crotch, seat, elbow, and knee areas within the layers of *Ventile* to offset the tendency for the suit to leak at those places. Obviously, the large, patched sections of the suit reduced ventilation, if indeed any ventilation could have been realized through the two-layered garment in the first place.

Another unfavorable aspect of the British suit, as with all dry suits, was the uncomfortable neck and wrist seals. These also gave evidence of tearing easily during donning and doffing. Still another serious drawback was the fact that the suit was of foreign source using a fiber of still another foreign source. Knowing the logistic problems and supply shortages we have had with personal equipment of domestic manufacture, the aspect of dealing with suppliers abroad seemed undesirable. Anyway, based on technological factors alone, the Mk-5 seemed to be the logical choice to make at the time (mid-1950's).

Continuing with our story, it was the midsixties, and the Mk-5 had "enjoyed" about 10 years of service use. Due to factors mentioned earlier, the need for a change of antiexposure suit was apparent. Flight personnel began to ask for, and in some instances locally procure, various versions of "wet suits" as a replacement for the still officially prescribed Mk-5 suit. As Fleet interest in the wet suit gained momentum, NADC attempted to make the transition to the wet suit concept orderly and controlled by

The Diver's Wet Suit has gained popularity in the Fleet.

The Modified Ventilated Wet Suit Assembly (CWU-33/P mod.) offers improved mobility and comfort over the basic VWS.

The *Ventile* antiexposure suit has generated much Fleet enthusiasm in the last year.

developing a ventilated version of the wet suit (VWS), designated the CMU-9/P.

Initial reaction by the Fleet was favorable, but problem areas were identified. The suit was found to be extremely restrictive to arm and body movement, leading to fatigue. This was admittedly due to the issuance of improper suit sizes and a lack of customizing. The suit had to be fitted to the particular user. By design, ventilation was necessary to achieve the required comfort. Unfortunately, in many cases, neither briefing rooms nor aircraft had the necessary air sources. This eventually led to fatigue and discomfort. It was also difficult to put on the *Nomex* flight coverall over the VWS. It was obvious that design changes to the CMU-9/P were necessary.

During the early part of the 1970's the CWU-33/P became the successor to the CMU-9/P as the standard issue of antiexposure clothing. This consisted of an integrated assembly of a bulk foam inner liner having a vent system bonded to its inside surface and a *Nomex* flight coverall secured to its outer surface. Donning was simplified by the combination of both garments. Bulk was reduced by the use of a more pliable one-eighth inch neoprene foam in the vent garment. Yet, despite the attempts made to overcome the shortcomings of earlier foam suits, a great deal of dissatisfaction was still registered by the Fleet. Restrictions to body movements necessary to perform inflight duties, incompatibility of anti-G suit, and fatigue induced by the coverall assembly were the primary objections. And this is the sentiment that prevails today concerning the CWU-33/P.

During this last year, interest in a newer version British *Ventile* suit has arisen again. The suit, now designated the CWU-21/P, was fully discussed in the SEP '76 APPROACH lead article.

The suit has had some limited use operationally, and the initial reaction by the users is that the suit is comfortable, allows mobility, is somewhat difficult to don, doesn't have to be custom-fitted (except for seals), is compatible with the anti-G coverall, and gives reasonably good protection in cold water.

This, briefly, is how it has been for 25 years! What can we glean from our past experiences to guide us more successfully in future efforts. Objectively, we can ascertain the following:

1. Exposure protection has always meant putting extra clothing on the man; the more you clothe him to enhance protection, the more you degrade his inflight comfort and maneuverability. Conversely, the more you favor his comfort, the more inadequate becomes the protection.

2. Crewmen have never really liked any form of exposure clothing provided them during the entire 25 years, whether it was the Mk-4, Mk-5, *Ventile* (1955 style), CMU-9/P, CWU-33/P, or what have you. The early display of enthusiasm for a new concept has always stemmed from their dislike for the existing system. The glowing remarks initially expressed for the CMU-9/P were really a reflection of the dissatisfaction with the Mk-5. As soon as the initial interest in the CMU-9/P was over, dislike for it began to surface. This same tendency has been repeated in each new suit transition. We are presently witnessing a return of the same syndrome. A general dislike for the CWU-33/P (justifiable to a degree) is leading to a rising interest in the CWU-21/P *Ventile* suit or a commercial diver's wet suit.

3. Acceptance of an exposure protection system is highly subjective as evidenced by the existence of a wet suit faction and a dry suit faction within the same Navy flying the same aircraft. This subjectivity is also evidenced by the diverse opinions given by evaluators of new suit systems. This subjectivity makes it difficult to technically satisfy the whole community.

4. The conditions surrounding the development and introduction of a new suit system are usually that of urgency and immediacy. The orderly and systematic approach necessary in any development process is compromised by the expediency in getting the hardware out. The new system is ultimately destined to failure of some sort because of a lack of preparedness – whether it be logistic, training, or support. The CWU-33/P is a victim of inadequate time spent to properly size and customize the suit assembly (inner shell, coverall, and anti-G) to each user's individualized dimensions.

Do these observations signal total futility? Not at all! As a matter of fact, they are the first rays of hope. Recognizing the obstacles of the past can enable us to overcome them. For example, the operational conditions regarding water survival and rescue have changed dramatically in the last 25 years. We used to talk about 24-hour survival in the "old days" when your signal devices were a feeble one-cell battery flashlight and a pair of waving arms. Any proposed exposure suit design that permitted a slight amount of dampness in a "mere hour or two" of immersion testing was considered grossly inadequate.

Today, however, with rescue times made shorter by means of a number of sophisticated rescue devices, we can afford to consider assemblies of lesser protection, knowing that rescue will not likely extend beyond 1-2 hours and very often will be effected in minutes. As a matter of fact,

exposure suit concepts that were rejected earlier may now be reconsidered because the rules of the "game" have changed.

Here are some facts recently gathered from Naval Safety Center records covering overwater rescues during calendar years 1971 thru 1975:

- 98 percent of fighter/attack crewmen were rescued in 2 hours or less; 92 percent in 1 hour or less.
- 91 percent of helo crewmen were rescued in 1 hour or less.
- 97 percent of rescues of fighter/attack crewmen were in waters 50°F or more; 77 percent in waters of 60°F or more.

Recognizing these factors, and in view of the approach of the 1976-77 winter season, NADC has just completed a limited evaluation of the *relative* merits of a number of currently available antiexposure clothing combinations from two standpoints. One is their relative comfort in the wearing or inflight mode, and the other is with regard to the exposure protection they can be expected to provide.

The five clothing assemblies involved in the comparison were a *Ventile* Assembly (CWU-21/P), Divers Wet Suit Assembly, Flight Coverall Assembly, VWS Assembly (CWU-33/P), and a modified VWS Assembly (CWU-33/P mod.). As in all of the configurations, the *Ventile* Assembly included the use of *Nomex* underwear in lieu of the batted underwear worn in the USAF system. The modification of the CWU-33/P (photo, pg. 3) is accomplished by the complete removal of the *Nomex* outer garment, the removal of the spacer material from the foam liner, and by cutting off the lower sleeve of the foam liner and replacing it with a sleeve extension made of *Nomex* material. The modified garment provides adequate fire protection and greater comfort. Instructions for Fleet modification of the CWU-33/P are now being prepared at NADC.

Live subjects, wearing each of the five assemblies, were immersed in tanks of cold water at 45°F and 60°F, and their skin temperatures measured at 13 locations on the body. A weighted average of temperatures were recorded and plotted against time of immersion. Subjects were removed from the tanks when they so desired. The recorded temperatures are intended to merely serve as a means for *comparing* one clothing assembly to another with regard to its ability to insulate against cold. All assemblies were suitable in offering protection – some were slightly better than others.

The immersion curves at 45°F indicate that the *Ventile* Assembly leads the rest in cold water protection, with the Diver's Wet Suit, CWU-33/P, and CWU-33/P (mod.) following behind as a group. The Flying Coverall, as was expected, offered least protection to cold. A significant observation made during the test was the sharp degradation in performance shown by a *Ventile* Assembly that leaked.

To determine the order of preference from a wearing and comfort standpoint, 50 pilots were selected from different squadrons in the Fleet and asked to perform the typical functions of flight readiness, preflight, cockpit maneuvers, cockpit egress, etc., and to subjectively rate the combinations in their order of preference. Other pilots at NADC flew the five combinations and subjectively rated them.

From the aspect of thermal comfort alone, the Flight Coverall Assembly was most favored, and the CWU-33/P was regarded as least desirable. The other three clothing assemblies were comparable and were placed between the above two assemblies in comfort rating. With regard to maneuverability, the Flight Coverall and Diver's Wet Suit were regarded best; the CWU-33/P (mod.) and *Ventile* Assembly were closely behind; and the CWU-33/P Assembly was rated least desirable. The ratings were of a highly subjective nature, bearing little statistical significance.

This brief history of exposure suit development has been presented merely to show the many approaches that have been taken to fulfill Navy requirements for exposure protection. The many frustrations experienced by the Fleet while awaiting resolution to the problems of protection are genuinely recognized. Fortunately, the protection requirements have eased in recent years as indicated by Naval Safety Center records. Because of this, a comparative assessment made of currently available exposure assemblies shows that a number of combinations are capable of suitably meeting requirements.

Based on the exposure environment and garment conditions as presently understood, the selection of exposure suit should be made by the Operational Commander.

Interpretation of the data gathered during the evaluation program indicates only a small difference in the exposure protection offered by a properly fitted and operating *Ventile* garment, Diver's Wet Suit, CWU-33/P (mod.), or the CWU-33/P total ensemble. Any one will provide adequate protection in 98 percent of the overwater survival incidents. Selection, therefore, will be based on OPNAVINST 3710.7 and the availability of the specified assemblies. It is recommended that if the CWU-33/P is the designated assembly that it be modified in accordance with instructions promulgated by NADC.

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AIR BREAKS

A Cheap "Gotcha!" Upon return from an operational flight, the pilot of a C-130 shot an ILS approach and made a normal landing. Touchdown was gentle, slightly left of centerline, but then instead of an easy rollout, the worms crawled out of the can.

Shortly after touchdown, the nose gear slammed to the deck and all crewmembers were thrown forward and kept there by continuous forces imposed by an abnormal deceleration. About 1800 feet down the runway the aircraft commander saw the parking brake was set. He quickly released it, just as all four tires blew out.

The aircraft began a left drift toward the toolies, but the aircraft commander kept the *Hercules* on the concrete by use of differential power. When all speed had been dissipated, the aircraft commander secured the engines, maintenance changed all wheels, and the aircraft was towed off the runway.

How and why was the parking brake set, you ask?

An hour before arrival at Homeplate, the third pilot was occupying the left seat while the aircraft commander quizzed him on the electrical systems. After prolonged questioning, the 3P indicated he had had enough by *setting the parking brakes*. Predictably, it was forgotten by the aircraft commander, copilot, flight engineer, an observer, the crew cook, and the 3P.

The parking brake is not an item on the descent or before-landing checklists. (We checked many other aircraft's checklists and it isn't on any we could find.) The only indicator of parking brake inflight engagement other than the position of the handle is the antiskid inoperative warning light. It should have illuminated when the gear was dropped, but the system was inoperative and had been turned off.

The command endorsement pointed out that it is the responsibility of each crewmember to exercise the utmost care to return all switches, levers, and handles to the proper position upon completion of demonstrations, drills, or training.

Luckily, this delta sierra was a mere incident, but had the aircraft left the runway, an almost certain major aircraft accident would have occurred.

The good news was the nice job the aircraft commander did in keeping the bird on the runway after the tires blew.

Just Like a Pro. The pilot and B/N of an A-6 were at work one night over a target. As they rolled in on the first bombing run, they were clobbered by a large bird. The bird knocked a hole in the windshield and glazed the rest of the windshield. The aft portion of the Plexiglas on the pilot's side also was knocked out.

The pilot broke off the run, climbed, and slowed the aircraft to see if flight characteristics had been adversely affected. They hadn't; the aircraft flew and handled OK. There was a hooker, however, because the pilot had no forward visibility. The pilot advised others in the flight of their predicament, and quickly another pilot climbed to their altitude to lend a hand.

The helper assumed the lead and the two returned to base. The crew of the damaged A-6 used de-fog and cockpit heat to keep warm. Glass particles in the cockpit made operation of the UHF rocker switches and IFF thumbwheels very difficult. Lead flew a perfect approach and detached the damaged A-6 with a centered ball. The LSO and B/N continued to talk the pilot down to a successful short-field arrestment.

The calm, thorough, professional manner in which the aircrew handled this emergency was exemplary. Several important points of the entire emergency can be made:

• LT Phillip A. Messier, the pilot, was wearing a dual-visor helmet, with the clear visor down. This shielded his face and eyes from the glass particles and bird parts that blasted him.

• CDR Jerry Rogers is commended for his quick response in taking the lead and leading LT Messier back to Homeplate.

• The LSO and B/N helped immeasurably in talking the pilot down to a safe landing and successful engagement after lead detached.

Gear-up Landing. The HAC and copilot of an SH-3 were airborne on a local training flight when they received a call from the tower. They were asked if they could proceed to a nearby air station, pick up a passenger, and bring him back to Homeplate. They advised they could hack it.

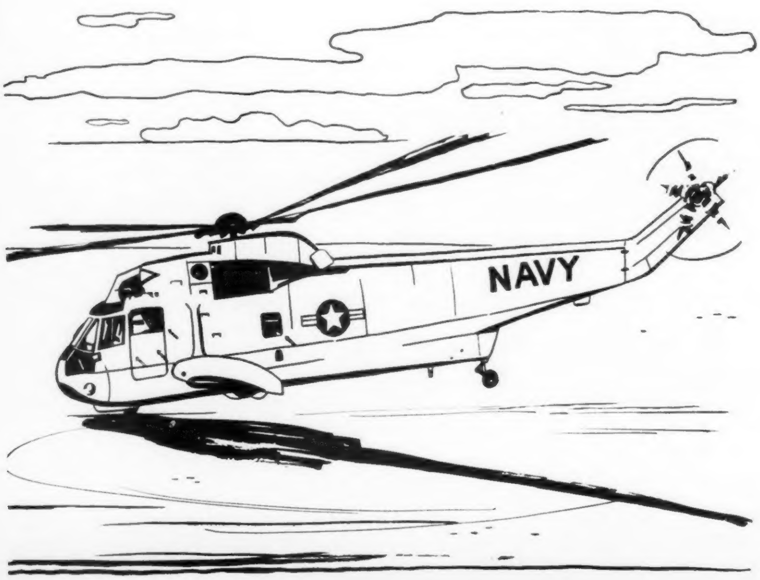
Upon returning from the short cross-country, they dropped off their passenger and resumed their training flight. They conducted many VFR approaches and landings at an outlying field, and after shooting several autorotations, headed back for final landing.

They requested permission to shoot a TACAN approach but when just a couple of miles out on final, they had to abandon the approach due to local traffic. They were cleared across the field to the heliport.

At no time during the TACAN approach or the VFR portion across the field was the prelanding checklist initiated. The copilot, who was flying, brought the helicopter into a hover and commenced to land. The HAC recognized an unusually nose-low attitude, took control, rose to a 15-foot hover, *lowered the gear,* and landed.

The helicopter had actually touched down under the copilot's control, but the touchdown was gentle and neither pilot knew it until after shutdown. The forward anticollision light was broken.

The question of why the pilots neglected to ensure completion of the checklist on the tenth landing of the flight remains unanswered. The checklist had been completed nine times before the final landing. There were no distractions, no emergencies, no waveoffs.



If the pilots had followed two other safety procedures, the incident could have been prevented — despite the forgotten checklist! The RAWS circuit breaker had been disabled during flight to eliminate an annoying steady aural signal. Neither pilot reported gear down, nor did the tower request a gear-down report.

There will be no tirade. There will be no philosophizing. The only comment to be made is that pilots must ALWAYS complete the checklist before landing.

Overturned Load. A helicopter arrived at a remote site on its second external/internal logistics flight. After offloading, the ground forces requested that the pilot reposition a water buffalo — previously hooked into the zone by another helo.

One member of the HST (helicopter support team) indicated that the water buffalo was ready to be picked up. It was hooked, but as the pilot lifted it clear of the ground, it turned completely over. It was carefully lowered to the ground and the HST member found one of the straps under the tongue, which caused the load to overturn.

Other personnel rolled the water buffalo onto its side, but they were unable to turn it up on its wheels since it was full of water. The straps were untangled and were again hooked to the helicopter to pull it upright. As soon as it was lifted clear of the ground, it turned back over onto its top. The water buffalo was lowered back to the ground and the helo, low on fuel, departed. At the time this was going on, the HST was operating with reduced personnel — too many jobs for too few qualified men.

The SOP for field operations calls for two or three HST loaders to ensure all lifting straps are clear. The job of lifting the water buffalo should have been deferred until it could have been done properly. ◄

Mixed Bag

By LT John Nacht
NAS Cubi Point

THE ASO of the air station climbed into the tower to see what was what. During the time it took him to go from the last few rungs on the ladder until he was looking out of the tower windows, a P-3 on long final had checked in over Grande Island, an A-6 called at the 180, an F-8 and A-4 broke overhead, a C-117 called inbound from Santa Rita, an H-53 reported inbound from Snake Island, and an H-3 waved off from helo spot 1.

It sounds like a tower operator's nightmare. It was! The ASO's comment was, "Hearing and seeing all this activity from the tower gives this ASO gray hair, and I'm only 26!"

NAS Cubi Point is fast becoming the busiest point for military air operations in the western Pacific. The problems associated with a high tempo of field activity (particularly during air wing fly-offs/on) is compounded by the integration of so many different types of fixed- and rotary-wing aircraft. So far, there have been no midairs, but there have been close calls in the pattern and on entry and exit from the airport traffic zone.

Certainly, no one likes to dwell on the idea of an unexpected and unplanned inflight meeting with a fellow naval aviator. However, a misunderstanding between controller and pilot, or a lapse in a pilot's attention and lookout capability, could easily result in a day-spoiler. Also, flathatting (God forbid!) as the air wing returns from sea with visions of cold San Miguel in mind, can result in disaster when it takes place around an air station.

Operations to date reflect the professional approach to flying exhibited by aircrews in the area. The continuing achievements in station safety are a credit to the tower operators and approach controlmen. There's also a coordinated effort by the safety organizations at Cubi Point and Clark AFB to keep a free flow of hazard information going. This identifies problem areas facing all military aviators using the two air stations and various other training areas in the Philippines.

"Heads-up in the pattern" is the Cubi byword, and that is expanded to heads-up on the ramp, too. Taxiing a C-130 amidst P-3s and C-118s can be a nerve-racking experience for pilots and linemen; not only is accident-free flying the goal, but also total elimination of the insidious ground crunch.

The types of aircraft seen at Cubi vary from the Aero Club *Cessna 150* to the Air Force's C-5, and from the *Harrier* to the sleek RA-5. On the day this article was written, the following aircraft were operating from the station: H-1/2/3/46/53, OV-10, C-1/2/9/130/141/117, S-2, T-39, F-4, A-3/4/5/6/7, AV-8A, P-3, E-2, and *Cessna 150/172.*

So, for you aviators planning to fly the crowded skies of Cubi, "heads up and on a swivel" is your slogan for avoiding day-spoiling experiences.

DEADLY DISTRACTIONS

THE demands of the ever-increasing IFR environment coupled with the complexity of modern aircraft have resulted in aircrews being required to spend more and more time with their heads in the cockpit. The most obvious hazard of this trend is the derogated lookout doctrine that results. The problem is particularly acute during post-maintenance checkflights or during aircraft malfunctions. Both situations divert attention from outside to inside the cockpit. Even under radar control, the chance of midair exists if lookout doctrine is not maintained. The following accident is an example of what can happen when adequate lookout doctrine is not observed.

An F-4 was being ferried from a repair facility to a base nearby. As part of this procedure, the F-4 entered the offshore operating area, climbing to about 15,000 feet to conduct some tests. The crew shifted radio frequencies and tried to contact the controlling agency without success. Further attempts to contact the control site for radar following were terminated when they noticed their cabin pressurization had failed.

After a descent to 8,000 feet, the pilot reset the cabin pressure dump valve. At this time the master caution light illuminated, causing the RIO and pilot to divert their attention inside the cockpit. Time: a few seconds before collision.

Meanwhile, two A-4Cs, one of which would be involved in the accident, had taken off from a nearby airfield for an offshore exercise with a surface ship. After takeoff, the A-4Cs commenced a climb and went through three frequency changes (plus an IFF change) in rapid succession. The A-4C wingman was at the leader's 4 o'clock position at 1/4 mile during the climbout. Suddenly, he became aware of the F-4J at extremely close range, at his 2 o'clock position . . . too late to broadcast a warning. Nevertheless, it appears that both the F-4J pilot and the lead A-4C pilot saw the other about 1-2 seconds before impact. They both initiated a pushover to try to go underneath the other, but their actions cancelled each other out and a midair collision resulted. Both aircraft went out of control. The F-4J crew successfully ejected, but, for unknown reasons, the A-4C pilot never ejected and was lost at sea.

The weather at the time of the accident was VFR, but there was a haze layer which caused the horizon to be ill-defined. This may have contributed to each pilot's perception that he was lower than the other aircraft.

There are many ramifications concerning operations and control in this operating area. Solutions are being actively pursued at several levels, yet it is apparent from this mishap that all aircrews must be eternally vigilant in maintaining a good lookout at all times, especially in crowded operating areas. In particular, pilots should make a conscious effort to avoid burying their heads in the cockpit, regardless of what distractions may be present or what tasks must be performed.

The cost of *not* keeping a good lookout is *prohibitive.*

Something new for the LAMPS program

THE state of the art in helicopter design and instrumentation has come a long way in the past 20 years. Helicopter instrumentation, navaids, and communications are now on a par with the stiff wingers.

Flying helicopters on instruments is not much different than flying any other aircraft on instruments, and within reason, helicopters are capable of any mission, any time.

There is, however, one other instrument system, a visual landing aid, which the operators of LAMPS helos and others have needed to improve safety of operations aboard aviation facility ships – the GSI (glide slope indicator). When installed, it enables LAMPS pilots to complete their approaches with comparative safety. Without it, in reduced visibility and at night, LAMPS pilots really have their hands full.

For example, one pilot, during a night recovery, almost splashed twice near the ship he was trying to land aboard. He had been launched at twilight and had worked over an area about 30 miles away. During the time he was in the operating area, a thick haze settled in, and he spent almost the entire flight on the gages.

On his first approach for recovery, he was using a ship-controlled radar approach. The ship had no GSI system. He was vectored to a final approach fix and began a descent and deceleration from 300 feet at 3 miles. His copilot maintained a constant altitude and airspeed commentary, but the pilot had no depth perception or visual cues and had to make corrections in-close that ultimately resulted in a waveoff. The violent maneuvers he had to execute to avoid ship obstructions almost caused him to lose control of the helicopter. The second approach also involved many close-in, low-altitude corrections, but the pilot was able to land successfully. The problem arose when switching from the gages to the landing phase at one-quarter mile at 60 feet altitude.

To emphasize the dangers involved, consider the case of another pilot. He was one of the more experienced pilots in the LAMPS program, but during a reduced visibility night approach to a ship without GSI, he prematurely shifted his scan from the gages to the outside and flew the helicopter into the water before executing a waveoff. Yet, the night before, he had flown 22 OK approaches to a GSI-equipped ship.

The pilot had no visual reference for altitude and glide slope, and depth perception was almost nil. Therefore, he had to rely initially on his copilot, and then shift to his own perception at the most critical time.

Fixed-wing night landings aboard a carrier have long

been recognized as a highly critical maneuver necessitating a mirror landing system, an LSO in direct communication with the aircraft, and the CCA team. Why do helicopters have to operate without *any* of these?

LAMPS helicopters have to land in a confined area, sometimes with less than 4-foot clearance from the hangar face. Further, at night the pilot can't see the rotor tip path plane. No wonder then that LAMPS pilots need help, since they are routinely expected to perform this most critical maneuver under all weather conditions.

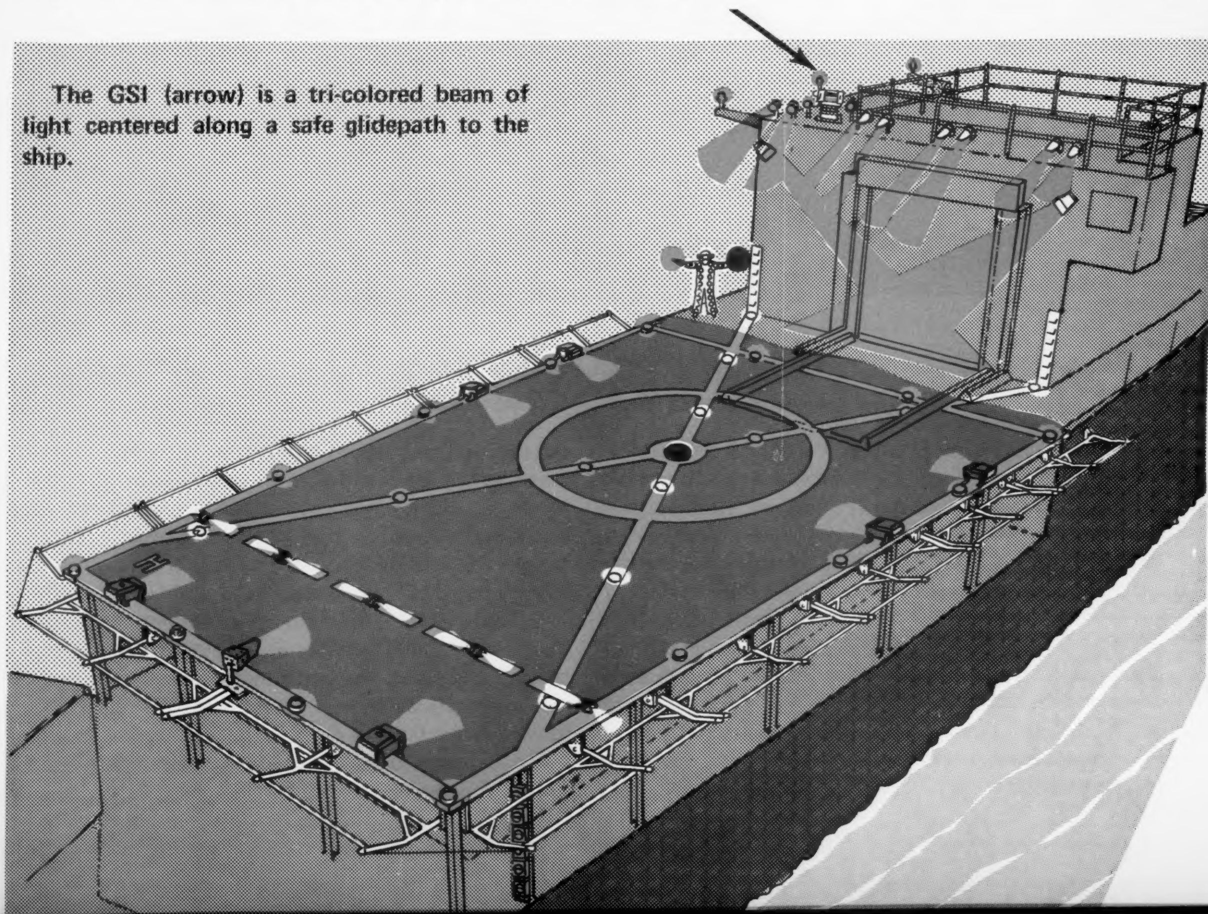
Consider also that the choice of whether to wave off in-close or salvage the approach is a difficult one for the helicopter pilot. Every aviator is taught on a waveoff to level the wings, add power, assume the correct angle-of-attack, and climb out. The helo pilot can't do that! He's faced with all kinds of obstructions in front of him, such as a 23-foot-high hangar, ship's superstructure, rough air, and an instant transition from VFR to IFR.

What the LAMPS pilot needs is a stabilized glide slope indicator to provide the visual cues necessary to establish and maintain the prescribed glide slope approach angle to the ship during IFR and night operations. It isn't that suddenly operations aboard nonaviation ships are more dangerous than before. Instead, past operations were conducted when meteorological conditions permitted adequate visual cues for a safe landing. Make no mistake that today LAMPS operations to non-GSI-equipped ships can be considered all-weather operations.

Once pilots using the visual GSI become accustomed to using an external altitude reference at night, they become much more comfortable. Large altitude fluctuations, caused by changing deck lighting of a pitching, rolling ship, are practically eliminated. Flying the amber area, pilots are able to easily detect and correct altitude changes before they become excessive.

The visual GSI provides the pilot with an outside reference which shows him whether or not he is at a safe altitude without constantly cross-checking the altimeter. It enables him to fly a much safer approach and reduces the hazards of night and IFR operations of the LAMPS weapons system.

At present, CNO has approved accelerated GSI installation by NAVAIRSYSCOM Voyage Repair Teams for over 40 more aviation facility ships. One can readily understand that the GSI system is not limited to LAMPS only. It will also be used to guide other helicopters and the AV-8A to landings on LPH and LHA ships and into land-based tactical sites. ◄



The GSI (arrow) is a tri-colored beam of light centered along a safe glidepath to the ship.

"I could look up through the overhead and port side of the aircraft and see a threatening wall of water. The thought of being engulfed by the next breaker was foremost in my mind."

HELO IN THE WATER!

DURING my 8 years of flying the SH-3 helicopter, I have always benefited from the experiences of other pilots and their response to emergency situations. Accordingly, I pass this information on to others so that they may learn from my experience when I was confronted with a sudden single-engine water landing from a 40-foot sonar hover.

I was in company with two other squadron aircraft, assigned to a screening station 6-8 miles from the carrier. My copilot was at the controls. We had been airborne about an hour. The wind line was 290 degrees at 20 knots with gusts to 25, sea state 4 with ground swells of 10-12 feet.

The crewman had just reported the sonar dome was at a depth of 200 feet and the cable visually centered. I had checked the gages and was preparing to take control of the helicopter. Suddenly, without warning, the afternoon calm was shattered by a loud, now increasingly familiar rumble and banging sound – my second compressor stall in 4 months. I took control and shouted over the ICS, "Compressor stall!", as my copilot applied full power.

I glanced at the N_f/N_r tachometer and noticed the No. 1 N_f decreasing to 60 percent and the N_r passing below 94 percent. The aircraft simultaneously yawed slightly right and began backing down. I recall stiff-arming the cyclic full forward to get the nose down as the aircraft descended into the water. We landed on the crest of a swell with no forward speed, oriented about 345 degrees. During the 4 or

HELO IN THE WATER!

By LT Thomas P. Pocklington
HS-6

5 seconds prior to water entry, I put out three Maydays: "736 in the water." No one acknowledged the call. We discovered later that no one heard the transmission.

Once we had stabilized on the water and had a chance to collect our wits, the tempo of cockpit activity increased remarkably. Due to the high sea state, my first concern was the stability and seaworthiness of the H-3. I ordered my copilot to lower the landing gear and blow the emergency flotation bags while my first crewman jettisoned his starboard window to facilitate egress should the helicopter capsize.

We verified that the No. 1 engine was the malfunctioning engine. My copilot secured the engine, switched to the upper UHF antenna, and turned the IFF to emergency. Several times we attempted to broadcast on UHF without success. The aircraft was now heading 360 degrees, quartering the swells at an angle of 40-60 degrees. As I sat on the water, I could look up through the overhead and port side of the aircraft and see a threatening wall of water approaching every 10-15 seconds.

The thought of being engulfed by the next breaker as it rolled in on my crippled bird was foremost in my mind. Fortunately, only the tops of the swells would break (whitecaps only), and the helicopter would rise above the swells like a small boat. At no time did I let the collective touch bottom. I maintained N_r at 100 percent. We rapidly

progressed through the single-engine water takeoff checklist. I alerted the crew to an ominous looking wave which was bearing down on us and appeared as if it would turn us over or flame out the good engine. Fortunately, the helo rode it well. But let me leave no doubt, it was one "heckava" ride.

Prior to starting the takeoff checklist, I doublechecked the RMI against the wet compass and saw a 30-degree error. I reminded my copilot that I wanted to take off into the wind line. Due to the swells, water taxiing could not be attempted. I elected to jump takeoff. As manual throttle was brought on the line, I adjusted the collective to build the N_r to 113 percent. At that time we were on the crest of a swell, so I decided to take off without delay. Our gross weight on entry was 17,500 pounds.

The takeoff went smoothly with N_r decreasing to about 95 percent where it stabilized. Prior to the liftoff, we had dumped 400 pounds of fuel, jettisoned the sonar hydrophone, marine markers, MAD and MAD reeling machine to lighten the helo. Once off the water, I let the N_r build back up to 100 percent while the airspeed slowly increased. Before we knew it, we were clear.

My copilot put out several more "Maydays," and this was the first time anyone knew about our predicament. Total time on the water was about 3 minutes. Enroute to the ship, we secured our fuel dump and manual throttle. Proceeding through the landing checklist, I saw my copilot switch the hover indicator from D-mode to A-mode. Then I saw the ASE OFF flag and realized I had been flying without the ASE engaged. I reengaged the ASE and made an uneventful landing aboard the carrier.

Based on this experience, I consider the following items most relevant:

- When a water landing is inevitable, get the nose over – don't land tail-first.
- Droop the rotor RPM as necessary to soften the impact while still trying to maintain directional control.
- Continue to fly the aircraft in the water.
- The helo will ride swells very well at a 40-60-degree angle to the swells.
- Don't let the sponson dig in on landing or liftoff and when floating.
- Check your ASE; ensure it's ON for takeoff.

During our debrief, other pertinent thoughts came to light.

- Our second ASW crewman didn't know we were going to ditch. The first time he became aware of it was when he felt the helo impact the water. He had been busy monitoring sonar and didn't hear the call over the ICS.
- We didn't switch to guard frequency, but remained on tactical UHF. There was a possibility that overhead aircraft may have heard us on guard.
- The landing gear was down and bags inflated on takeoff. However, by executing a jump takeoff, the bird's configuration didn't affect our ability to get airborne in a fairly high sea state.

Perhaps there was a certain amount of luck involved in that no injury occurred and the aircraft sustained no damage. Nevertheless, the aircrew's prompt, accurate response and compliance with NATOPS procedures were the framework for this successful recovery. Crew coordination was the cohesive element that led to a happy conclusion to a hairy afternoon.

Marine Joke

AN official message was recently received from a northwest air station, describing the rescue operations involved in a recent major flood. The concluding sentence of the message revealed the originator's sense of priority: "During the 4 days and nights of operations, the SAR helos from NAS Northwest evacuated 108 people, 8 dogs, 2 cats, and 5 marines.

Bravo Zulu

Capt Frank B. Smith, USMC

CAPT Frank Smith and his crew of six from VMGR-152 (Marine Aerial Refueler Transport Squadron) were scheduled for a routine logistics flight. They were preparing to depart NAF Atsugi, Japan after a one-night RON for crew rest. The morning of departure was dark and dreary. Rain came down in a steady pour as the crew completed their preflight inspection. Finally, all was ready and engines were started as the copilot, lst Lt Paul Stouffer, went through the checklists with the aircraft commander and GySgt S. D. Alverez, the flight engineer.

After completing the checklists, runups, and the before-takeoff crew briefing, they were cleared for takeoff. The weather was measured 400 feet overcast and a half-mile visibility. Power was smoothly applied, and the 65-ton *Hercules* rolled. The standard phrases were heard over the ICS: "VMC . . . my yoke . . . takeoff/refusal." The nose was raised and the aircraft began to climb. Then over the ICS the crew heard, "gear . . . coming up . . . flaps . . . departure, this is . . . BANG!" A loud explosion was heard and the aircraft started yawing to the left. The port wing dropped, and the aircraft began to buffet severely as they reached 150 feet.

The overhead control panel warning lights lit up like a Christmas tree. Gunny Alverez immediately responded by isolating the wings, shutting off bleed air valves, and resetting No. 1 and 2 generators. He said, "We've got a bleed air rupture, Captain." Then another report: "Sir, this is the first mech. We've just lost 5 or 6 feet of the port wing leading edge all the way back to the bulkhead between No. 2 engine and the fuselage."

In these short, miserable seconds Capt Smith had all he could do to keep the aircraft under control. Torque had dropped 3000 psi per engine, across the board. The buffet was so severe that it was hard to see the instruments. They were dangerously low, and they were in the goo. Even worse, movement of the yoke was extremely difficult. With great effort, the aircraft commander lowered the nose a tad to gain a precious few knots of airspeed, while trying to keep climbing. The copilot raised the flaps to 20 degrees which reduced some drag, while still keeping rudder booster pressure up. He also declared an emergency and requested an immediate GCA back into Atsugi, after finding out that Yokota weather was just as bad. Capt Smith ran a controllability check and found out there was less buffet at 150 knots, so they shot a GCA at this higher speed. The aircraft broke out prior to reaching minimums, and a safe landing was made.

Capt Smith and his crew, through expert airmanship, presence of mind, and good judgment overcame a potentially disastrous situation. The result was many lives saved and the return of a valuable aircraft. Well done!

The performance of Capt Smith and his crew, under adverse conditions, is truly commendable. This mishap brought to light an administrative oversight which resulted in noninspection of the KC-130 bleed air ducts. As a result of the post-mishap investigation, a proposed airframes bulletin is being prepared for C/KC/LC-130F aircraft which will provide for high pressure cold air checks of wing leading edge bleed air ducts. — Ed.

RECOGNIZE ANYBODY?/The following were

"... demonstrating how to pass football – hand went through window."

"... cleaning lawnmower blade while engine was running."

"... firecracker did not go off, so I picked it up."

"... putting onions through slicing machine; thought they were stuck, so I pushed them through with my fingers."

"... while making sandwich, I wiped my knife on my thigh and cut it."

"... got angry at his car and struck said car with right hand."

You'd better be extra careful when y

- may have work
- may tow you
- may help
- may give yo
- may control yo
- may be you
- may be in
- may

abstracted from OFFICIAL INJURY REPORTS:

" . . . during an argument with another man, I was hit in the head by a street sign."

" . . . walked into wall."

" . . . bounced pool cue on deck, and it bounced up and hit me in the eye."

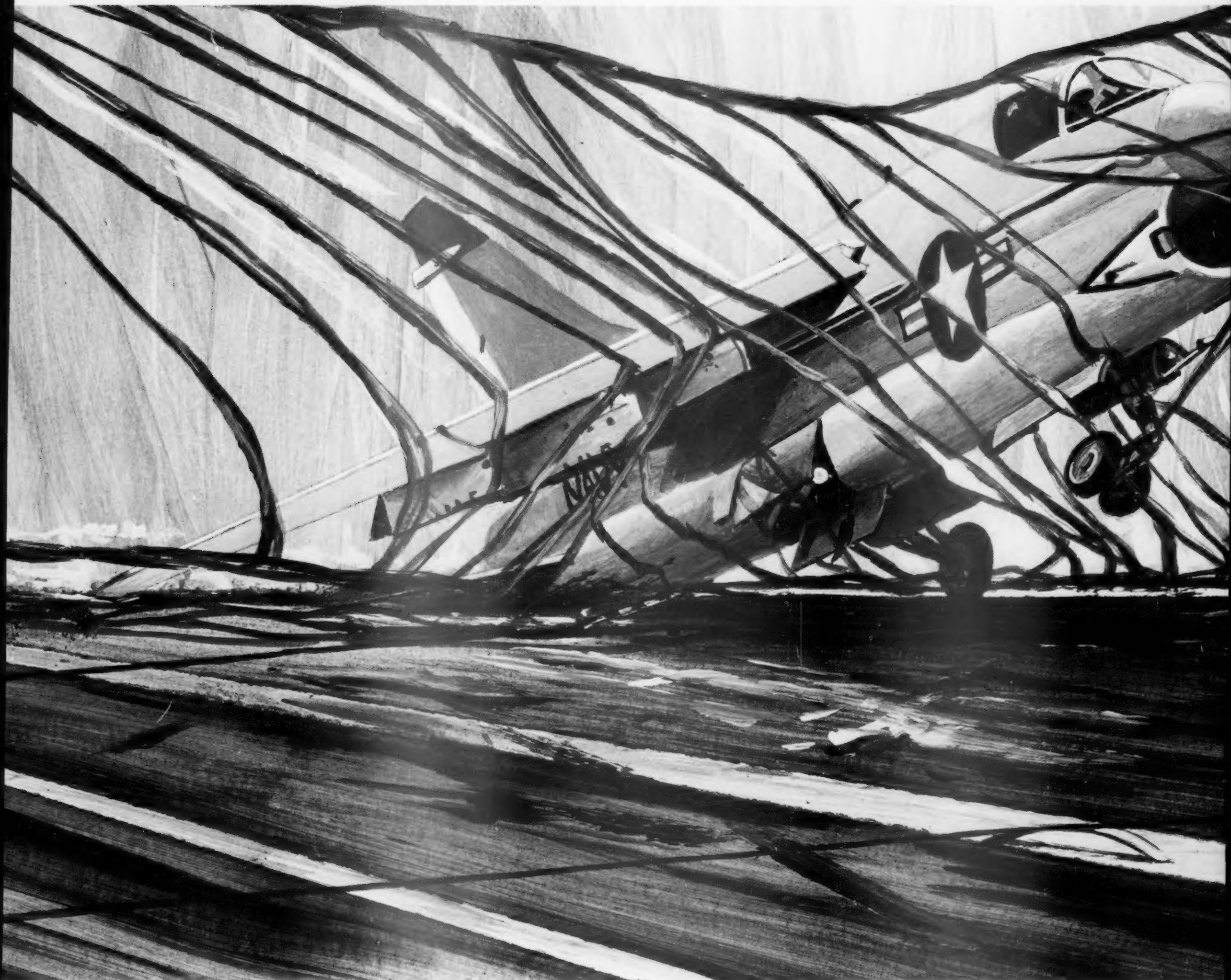
" . . . bomb was falling off wagon – I tried to catch it."

" . . . was polishing shoe with one foot on chair. Fell and hit head when changing position."

" . . . hit in head by aerosol can thrown by wife. Injured right hand when he punched wife."

ou realize that these same individuals
d on your aircraft.
ut of the hangar.
you start up.
u taxi signals.
from the tower.
copilot today.
your crew.
e YOU!

By Capt G. H. Ulrich
MAG-26
Reprinted from *Safety Raiser*

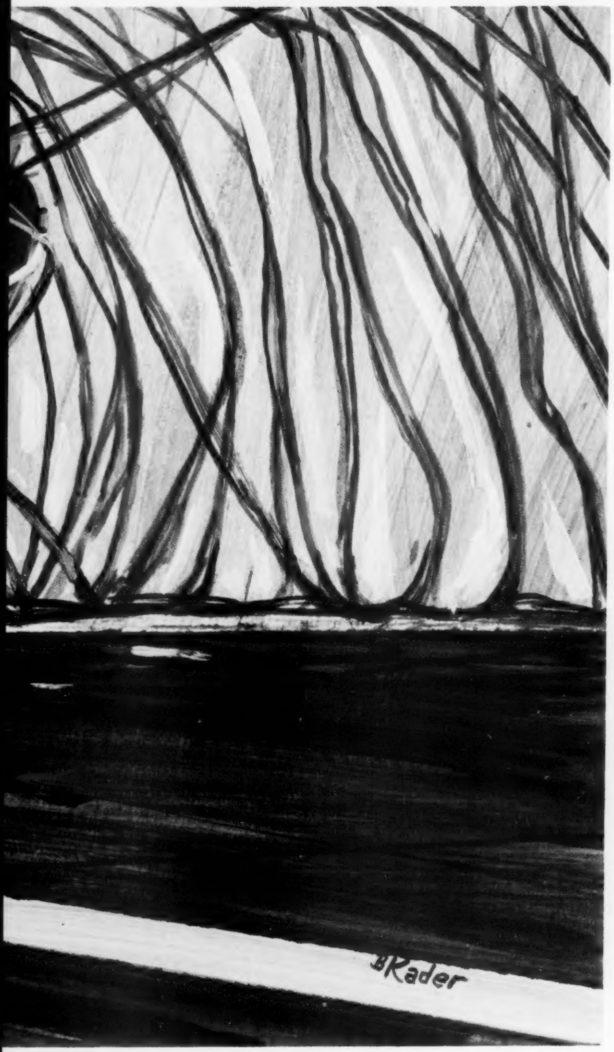


NUGGET NIGHTMARE

RAMP strike! Oil starvation! Barricade engagement! Nosewheel-first landing! Sheared mainmount! What is this – a list of naval aviators' worst dreams? Probably, yes. But definitely, when this happened to an inexperienced pilot all on the same night, you know it was a real nightmare.

The young JG had been in the A-7 squadron only 2 months and had but 442 total hours the night he was scheduled for a surface and air surveillance hop. Nevertheless, he had been brought along carefully and was showing normal progress as his experience built. He had had eight day and four night landings in the past 30 days.

The flight and initial portion of the approach were normal except for a slightly late commencement at a fast



airspeed. The pilot corrected his speed during the approach, however, and was on speed by platform. CATCC instructed the pilot to dirty up at 8 nm and proceeded with an ACL lock-on. When the needles failed to check OK, the approach was downgraded to a Mode III.

Watching the approach from the platform was the CVW LSO, a qualified LSO, and an LSO trainee who was manning the pickle. The approach was slightly underpowered and low, but the aircraft arrived at the waveoff point in an acceptable position. Unexpectedly, the pilot reduced power further at this point. Four power calls, each with more volume and urgency, caused the pilot to go to military power. In an effort to clear the ramp, he also rotated noseup. But the ramp strike occurred.

The *Corsair* impacted the ramp with the hook and the lower portion of the aircraft, approximately 9 feet from the trailing edge of the tail cone. The aircraft skipped all the wires and boltered.

The LSO called the air boss and reported the ramp strike. Meanwhile, the CO of the ship directed another aircraft to get an inflight inspection of the A-7 to determine the extent of the damage. The airborne tanker rendezvoused on the damaged *Corsair* and noted a dented tail cone and partially extended tailhook. To add to this damage, the A-7 pilot noticed the MASTER CAUTION light on and saw oil pressure decaying to 15 psi. Following emergency procedures, he extended the EPP and set the power at 84 percent. Meanwhile, the oil pressure had dropped to zero.

Based on the oil pressure loss and the damage to the tailhook, the decision to barricade the aircraft immediately was made. CATCC gave inbound vectors to the A-7 and passed control to the final controller. Since rigging the barricade was not complete at this time, the controller gave a downwind heading and intended to turn the aircraft in at about 5 miles. As the aircraft passed 2.5 miles downwind, the LSO transmitted, "306, Paddles, we have contact with you; you're in a left turn; is that affirmative?" The aircraft rogered this transmission, setting up a communications misunderstanding back on the ship.

CATCC and the pilot assumed the LSO had taken control of the approach by virtue of this transmission. The LSO assumed the aircraft was turning inbound on a radar vector and was thus 5 miles or so from the ship. Air ops assumed LSO had control. The end result was that the crippled *Corsair* arrived at the ramp before the deck was clear and had to execute a waveoff.

Fortunately, engine response was normal on the waveoff. The aircraft turned downwind and the LSO took control of the approach. By this time the barricade had been rigged and the landing area cleared, so the LSO talked

the aircraft around to a 1.5-mile final. As the pilot reported the ball, the air wing LSO, who had taken over on the platform, started talking.

"OK, now fly that ball right in the center for me. When you cross the ramp, I'm going to ask you to pull the power to IDLE. No higher, now. No higher! Let it down now. LET IT DOWN! NOSE IT DOWN! POWER BACK, POWER BACK!"

The pilot had arrived on the ball with zero oil pressure, fast, and slightly high. The power was set at 84 percent and only one power reduction was made on the ball. As a result, the aircraft was high and fast on the glide slope, and when urged by the LSO to "get it down," the pilot dropped his nose and went to IDLE. The result was a nosewheel-first landing at an estimated 1600 fpm rate of descent. The aircraft bounced once, engaged a wire, and was then enmeshed by the barricade, 25 feet right of centerline. The starboard mainmount sheared, and the aircraft sustained CHARLIE damage. A parked A-3 sustained damage from flying debris, and two flight deck personnel were injured.

The cause of the accident was identified as pilot error. Poor power control, flying a low, slow approach, easing gun in-close, and lack of response to LSO calls were all identified as causes for the ramp strike. Since the pilot was new and inexperienced, supervisory factors were considered relative to his ability to handle the mission. The conclusion by the mishap board was that he was qualified and appropriately scheduled for this flight. Although he had shown a tendency in the past toward poor power control, the trend was not dangerous, and the pilot was progressing well as he gained carrier experience. He had received a substantial number of day traps prior to commencing night work, and he had successfully completed four night traps in the previous 30 days. Finally, the weather was ideal.

The LSO was also exonerated of responsibility. The aircraft was in an acceptable position as it reached the waveoff point. The ramp strike was made imminent when the pilot pulled power at this point. Even when the pilot went to military in response to the LSO's frantic calls, the sink rate could not be arrested. The board surmised, however, that had the pilot not pulled the nose up in an attempt to stop the sink rate, the aircraft would not have impacted the ramp.

The lack of coordination and communication aboard the ship, while not a cause factor in the accident, was nevertheless a significant point brought out in the accident report. The end result of this lack of coordination was the aircraft's arrival on the ball before the barricade was rigged, necessitating a waveoff. Fortunately, the engine held together in this situation, but it's not too difficult to imagine how a waveoff with an oil-starved engine could result in its total failure.

The waveoff also added even greater urgency to getting the aircraft aboard due to the extra time the aircraft was airborne with zero oil pressure. Thus the pilot was boxed around in a short, rapid pattern for his second approach, resulting in a less than optimum setup.

The mishap board emphasized that air ops must take positive steps to ensure coordination in situations like this. It is up to them to ensure that all the key people are kept informed of the situation so they can make optimum decisions.

Another significant recommendation to come out of this accident dealt with the type of approach that should be flown with an oil-starved engine. NATOPS procedures do not address an instrument or VFR approach to a carrier with oil pressure failure. Some experienced pilots prefer to fly a normal approach once on final. Others prefer a constant power approach. In this case, the pilot was advised to fly a constant power approach, and the large divergence from optimum airspeed and glide slope that ensued resulted in excessive damage during the barricade arrestment. The board recommended that cognizant test facilities investigate this problem and provide guidance.

Finally, the board reiterated the requirement to keep all unnecessary men off the flight deck, particularly in a barricade situation. For those manning hoses, the board recommended that they be positioned in an area as protected as possible.

Outside of combat operations, the night carrier landing is undoubtedly the most challenging and difficult event the naval aviator routinely undertakes. Most aviators can look back at one or two occasions where a ramp strike was averted by only an inch or two as their aircraft settled in-close or came staggering up from below the rounddown on a waveoff. The pilot involved in this accident was described as conscientious, dedicated, and improving. It was recommended that he fly several day carrier landings and then progress into night work again when the LSO judged his performance to be satisfactory. "There but for the grace of God go I" is an appropriate comment for the many naval aviators who were just a little luckier than this gent. ◄

One problem with being optimistic is that people think you don't know what's going on.
Ace L.

The right-side canopy glass was broken. The right-side canopy supporting member was broken. The port and starboard A-6 wingtips, which were folded, were damaged, and the fuselage skin around the canopy area was damaged. The aircraft was in the hangar awaiting work when . . .

The canopy was jettisoned

OPENING and closing canopies using the actuation switch is routinely performed by those qualified. At a rework activity which employs many foreign nationals, those who operate canopies are instructed on proper actuation. But, through confusion or haste, one worker activated the wrong control. The above mentioned damage resulted.

The worker meant to close a partially opened canopy to provide better aircraft security, which the activity stressed to all employees. His intent was consistent with policy; the result was not.

The aircraft had been offloaded from a carrier tied up at the pier. It had been sent to the repair activity for evaluation and repair following hard-landing damage. The A-6 had been aboard a couple of weeks awaiting its turn for rework. The employee had an English reading ability, but when questioned about the word "jettison," had no idea what it meant. The access door which houses the handle is marked "Canopy Jettison Only."

The canopy breech safety pin was in the pilot's map case. Had it been installed, the canopy wouldn't have jettisoned. Why the safety pin wasn't installed is a mystery. The employee who certified the safetying of canopies/seats was not aware of the need for, or the existence of, a canopy breech safety pin. Consequently, no inspection was made for it. Perhaps, however, the pin was removed before the aircraft was offloaded.

The employee who blew the canopy was charged with ensuring physical security, and specifically, to close any open canopies. Amazingly, though, he had received no formal training or indoctrination in the operation of the A-6 canopies.

The other employee charged with certifying the proper pinning/safetying of canopies and ejection seats had not received training in safetying procedures. Nor was he informed about the number of installed pins to look for in a fully safetied aircraft.

The investigators felt a reasonably prudent person would not have activated the canopy jettison or any control unless he was sure of its function. The employee graduated from a 2-year aircraft maintenance course, had 3 years' experience with a civil aviation company, and then had worked for the repair activity for 4 years. Further, he claimed to have known the difference between normal actuation and emergency open. However, it was the first time he had attempted to open or close an A-6 canopy and he became confused.

The rework activity took immediate steps to correct the obvious shortcomings in their indoctrination/familiarization training program. As a result, it now designates only certain qualified personnel to operate controls. Nondesignated workers are not allowed in cockpits. They also may not activate external canopy controls, except in an emergency. The activity recommended that aircraft operators and custodians ensure proper pinning/safetying of all emergency systems prior to aircraft transfers to rework activities.

All ships and squadrons operating aircraft must recognize the potential safety problems inherent in the diversity of aircraft handled. It is necessary for all hands to be checked out in the peculiarities of the aircraft to which they're assigned.

The story of G

By CDR A. F. Wells (MC)
Cecil Field

WHOLE and fractional multiples in meters/seconds squared of the gravitational acceleration of this planet are frequently of concern to those who slip the surly bonds of Earth. This concise term, while certainly simple enough for aviators, is a trifle unwieldy for the medical/physiological types who write the books. To simplify their cerebral activity, the shorthand term "G" has been adopted. It's a catchy little term.

G forces act on an aircraft and its pilot when either speed or direction is changed. The G force that usually concerns us is parallel to the yaw axis, and when considered in relation to the pilot, is directed head to foot. This is positive or eyeballs-down G. The Mark 1 Mod O naval aviator (one each) is designed by the Master Engineer for a 1G eyeballs-down environment.

Let's envision a 4G pullup. This causes each part of your body to increase its weight by a factor of 4. This means that the 160-pound aviator now weighs 640 pounds. The only thing that keeps him from transitioning into the stomped frog configuration is the fact that he possesses a skeleton. This serves as a framework upon which to hang livers, spleens, lungs, and other such miscellanea. However, not all of your organs are firmly attached to your skeleton. There's one organ in particular that is not, and we all know what that is – your blood, of course. (You thought *what?)*

Now, in this 4G pullup your blood has been transmuted (changed/altered) from a rich broth full of soft, squishy little sacs to a metallic mercury, mixed with tiny birdshot; the whole of which is trying to run down into your feet. There are various gates, valves, and diminishing radius pipes which have been incorporated into the system to prevent this very thing. However, 4G is too much of a system overload. You end up with very florid feet. And when the blood is in your feet and legs, that means it ain't somewhere else; and the somewhere else that it ain't is in your head. Blood carries oxygen. And if there are two things that require a constant source of oxygen, they are your eyeballs and your brain. No blood in the head means no oxygen to the eyes and brain, and without oxygen they shut down. (Incidentally, so do you.)

This means that the 160-pound aviator now weighs 640 pounds.

And if there are two things that require a constant source of oxygen, they are your eyeballs and your brain.

The eye is the most sensitive indicator of too much positive G. The eye responds to positive G in this progressive fashion:

- Color vision gradually changes to black and white.
- The outer portions of your visual field begin to close in until it appears that you are looking through a tunnel at the instrument panel.
- When the tunnel narrows to a diameter of zilch, you have loss of vision.

As G is relaxed, these functions tend to return in reverse order.

Prolonged and excessive positive G leads to unconsciousness. This leads to deterioration of basic airwork. (In some flight surgeons, an improvement may be noted.)

The cure for all these woes is twofold – either release G loading or increase your ability to withstand G. Releasing G loading is obvious and is well known to ACM experienced aviators. You can actually monitor your G loading by adding back stick until color goes and the walls close in, and then releasing back pressure until your vision improves.

Your own personal G tolerance can be increased by the G suit, the so-called Valsalva maneuver *, and GOOD PHYSICAL FITNESS.

The G suit inflates at about 2G. The more G, the more pressure. This adds external pressure to your legs and abdomen and tends to collapse the blood vessels. Less space is available in your legs to hold blood, so less blood goes into your legs. Thus, more blood is available for your head.

The Valsalva maneuver uses your own muscle power to collapse blood vessels in your abdomen and probably your legs. The result is the same.

Muscular people tend to have more G tolerance than soft, fat, marshmallow-type people.

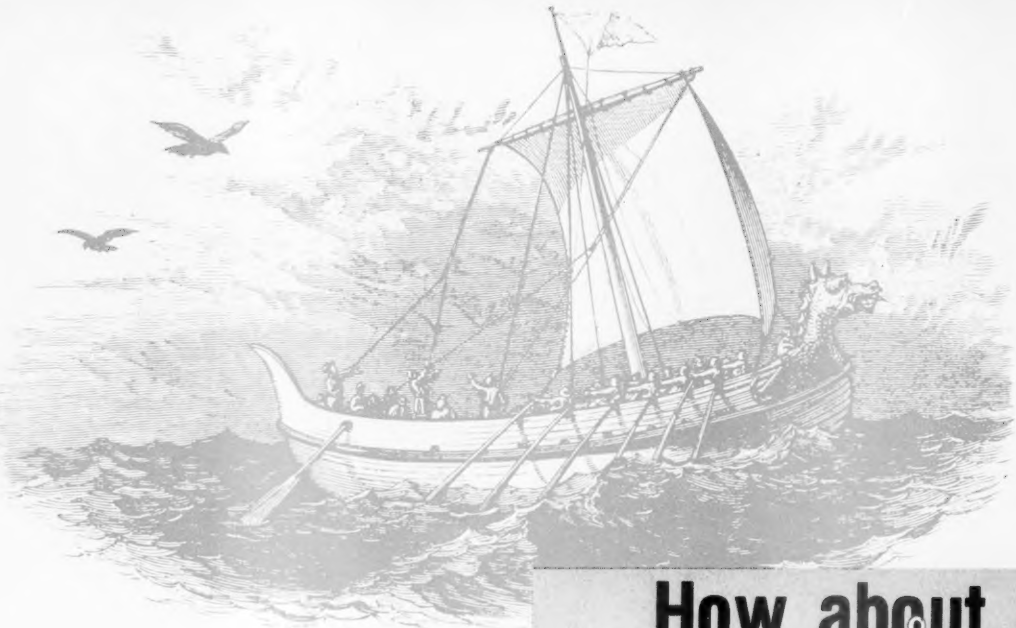
There are other types of G than positive G. Negative G (eyeballs-up) is another matter altogether. It is very poorly tolerated. Fortunately, it is seldom experienced in aviation except in outside loops and other forms of masochistic foolishness. Lateral G (eyeballs and head sideways) is seen in such situations as sliding your 240Z sideways into a telephone pole. It is best avoided.

G is an inevitable aspect of flight, particularly in tactical aircraft. Therefore, wear your anti-G equipment, practice blood pooling prevention techniques, and keep in good physical condition. The "Story of G" may not be as interesting as the "Story of O," but it'll do more for you in a hassle.

*Actually the M1 maneuver, straining down with verbal grunting.

Your own personal G tolerance can be increased by the G suit.

Muscular people tend to have more G tolerance than soft, fat, marshmallow-type people.



How about a modern safety program?

By LCDR Russ Harrison
VAQ-130
Safety Officer

IN this age of highly sophisticated aircraft, computerized weapons systems, and highly trained aircrews, why is our overall safety program ancient in comparison? NATOPS quizzes, safety lectures, and survival briefs are excellent parts of a safety program when used properly, but a steady diet of these will cause them to lose much of their effectiveness. As in any educational process, you must have the attention of your audience before you can get your message across. Our message is safety, and when the audience says, "Oh, no, not the same old thing again!", our chances of getting this message through are seriously endangered.

One of the largest dinosaurs in our program seems to be our selection of movies on accident prevention. The vast majority are outdated, poorly acted, and have little to hold the attention of the viewer. The few that are good have been received with enthusiasm and are quite effective. The effectiveness can be measured by the amount of discussion about the movie when it is finished. You have to remember something to be able to discuss it.

I would be remiss if I did not offer some suggestion on how to modernize the safety program:

An article on new developments in safety education is forthcoming. – Ed.

a. Video tape a series of presentations by various professional speakers, such as Dr. Baumberger of the Navy Postgraduate School, and have them onboard all carriers. As CVs are very limited in their selection of accomplished speakers and associated lecture aids, a film library of this sort would allow selected briefs to be shown over IOIC (Integrated Operational Intelligence Center) television in the readyrooms.

b. Increase the quantity and quality of safety films at every NAS and aboard every CV. Several aircraft corporations have excellent safety movies. Get copies of these movies. Invest necessary funds and have a professional, big-time film company make several safety films. Use good actors and actresses. Don't be afraid to have the film rated "R" because of the vocabulary or a touch of sex. Make the film realistic. Design it to hold the interest of the intended audience. The average naval aviator is just as receptive to a good cartoon as your normal school kid, and cartoon characters can do anything you want them to do – with no actual footage of an aircraft crashing – and get the message across loud and clear!

c. Use computers for "safety games" such as ACM, emergency situations, and tactical problems where incorrect decisions may result in dangerous situations. Computer programs can be made for individual use for man versus computer type games or for individual versus individual type games, using the computer as an interface. The computer, having been programmed, directs the game in all cases, using actual aircraft data for the model desired.

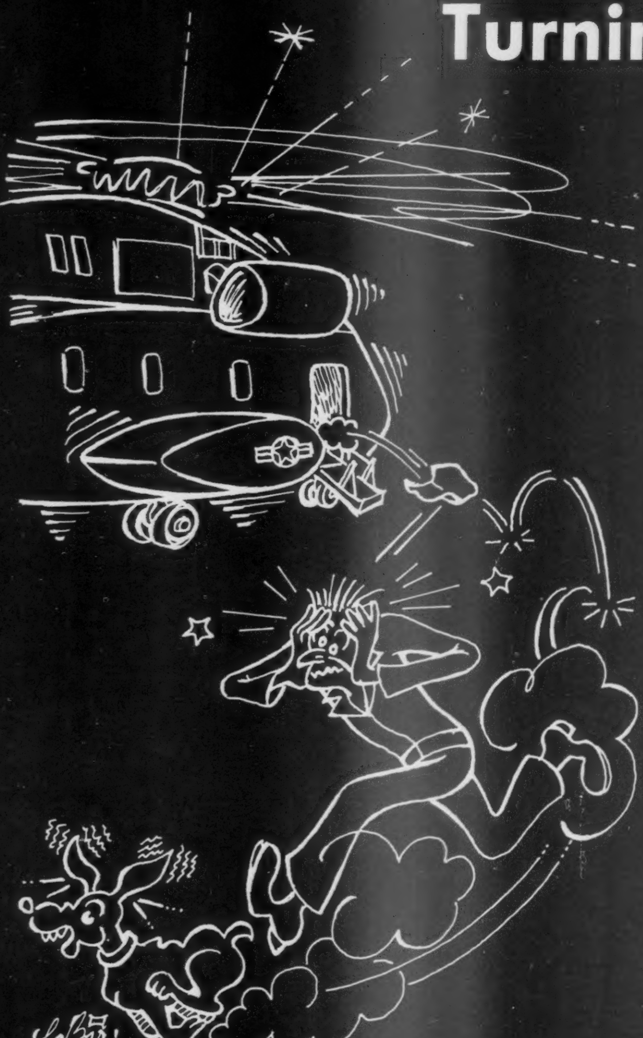
Most large aviation facilities have existing computers which are suitable for these games with little or no extra equipment necessary. Computers in IOIC on CVs and the VTS (Versatile Training System) computers at most naval air stations are quite capable of performing the required tasks. There is very little computer time used on games, and a standard terminal may be used by the aircrew since communications with the computer are made by pushing a button to indicate a multiple choice response to a computer question.

Presently, the VTS computers on most naval air stations have existing game programs of a non-safety variety. Take a few minutes and play one of these games (for instance, try the Civil War game), and see if you agree that the potential for using computer games as part of a safety program is excellent.

All these programs require funds and technical facilities which are beyond the capability of a squadron or air wing. If a program of this nature is to be effective, it must be done correctly. That does not mean taking bits and pieces of older programs and putting them together and calling it new. A good program which can be used Navywide is going to cost some money and take some work. But if the end result is the savings of several multimillion dollar aircraft and even one irreplaceable life, then the program is worth it.

Of course, we can just continue with our present programs. But these programs seem to derive their effectiveness from the new twists that safety officers can put into them, and safety officers are limited by funds and facilities available. If we are satisfied with the present accident rate, then let's keep plodding along. If we want to reduce the accident rate even further, then let's modernize our safety program.

Turning JP into noise



By LTJG David M. Tyler
HM-12

THE ability to hear is a most precious gift. The full or partial loss of it can cause isolation, change in attitude toward life, diminished enthusiasm, and demise of self-confidence. Among those of us who are involved with the unnatural and noisy mechanical processes required to propel our flying machines (particularly helicopters), there may be some who are not fully aware of the noise hazards that can cause permanent hearing loss.

Noise is unwanted sound and is often considered a useless byproduct of mechanical processes. It is well known that continuous exposure to noise levels in excess of 90 dBA can permanently damage hearing.

Both the Navy and OSHA (Occupational Safety and Health Act) use 90 dBA exposure for 8 hours as a baseline for damage risk levels. If sound pressure levels increase, exposure times decrease collaterally.

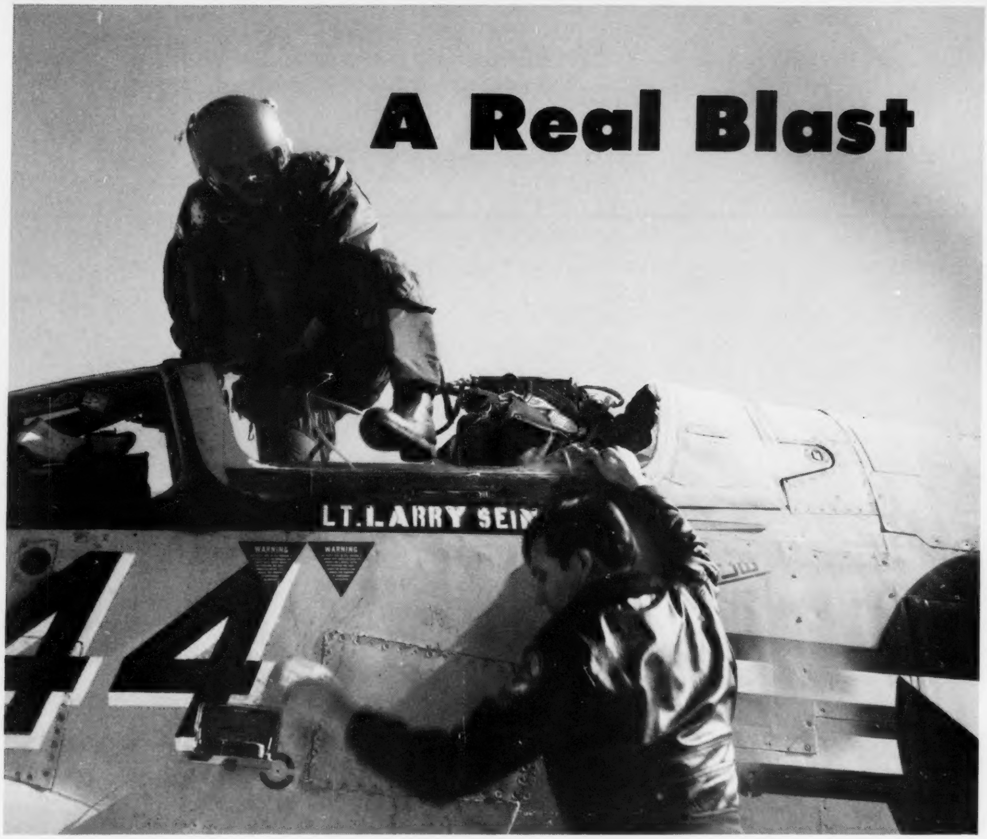
The higher frequencies, 500-6000 Hz, are the frequencies we are primarily concerned with in voice communications. Lower frequencies, 250 Hz and below, are believed to be more significant in vestibular (inner ear) involvement and sinusoidal vibration. They cause nausea, headaches, and disorientation discomforts when excessive. *(There is concern among hearing experts that "hi-fi" buffs are incurring damage from sounds above 10,000 Hz. – Ed.)*

When the A-weighted scale is used in measuring noise levels, the differences in frequencies are taken into account and the dBA scale is used to simulate the way we hear. It's used in measuring the damaging effects of noise.

HM-12 recently evaluated the noise hazards of the RH-53D. Considerable interest in noise levels developed after the removal of sound treatment material from some of HM-12's RH-53s. Some interesting data was also revealed. The sound treatment was removed from certain aircraft due to hydraulic fluid saturation which presented a fire hazard. When the sound treatment was removed, noise levels became noticeably higher, impairing communications between the pilots and aircrewmen. Sound level readings of 120 dBA were taken in the cabin section during high torque (HOGE) conditions, which are encountered in airborne mine countermeasure (towing) operations. The noise levels were noted to be approximately 10-12 decibels higher in the helicopters without sound treatment compared to those with sound insulation. This is significant considering noise levels double with every 3 dBA increase.

Further study revealed that the SPH-3 helmet provided a maximum attenuation value of 28.7 decibels if properly fitted and modified. This brings the noise reaching the aircrew's ears down to 91.3 dBA, so the protection of the SPH-3 helmet alone, in such a high noise environment, is questionable. Most standard Navy earplugs provide an attenuation value of about 25 decibels, and if worn in addition to the SPH-3 helmet, reduce noise hazards to a reasonably safe level (below 90 dBA).

Therefore; aircrew, maintenance, and ground support personnel must be continuously reminded about the hazards of exposure to high noise levels, both in and around the H-53. The insidious loss of hearing throughout the aviation community can be arrested if proper precautions are taken. So, use protective helmets, "mickey mouse" ears, and properly fitting earplugs – you all hear?



LT Larry Sein of VFP-63, Det 4, was on a photography training mission in an RF-8G, cruising in the vicinity of NAF El Centro, CA, at FL230, .85 indicated Mach number, when, for unknown reasons, his canopy imploded. Due to windblast, the ejection seat face curtain was pulled partially free and began flailing violently, striking LT Sein's helmet with enough force to severely damage the visor cover and force the visor up from in front of his eyes.

LT Sein immediately lowered his seat, reduced power to idle, and extended the speed brakes to commence a descent toward NAF El Centro. He declared an emergency and informed Tower that he would execute a short field arrestment on Runway 30 since the long runway was closed. Due to small pieces of Plexiglas and debris in his eyes, LT Sein's vision was beginning to blur badly. Avoiding all populated areas due to the possibility of accidental or intentional ejection, LT Sein made a successful approach and short field arrestment in spite of his impaired vision.

Throughout this incident, LT Sein demonstrated a high degree of professionalism, composure, and aeronautical skill in averting what could have been a disastrous aircraft accident. Additionally, recognition must be given to PR1 B. Coram of NAF El Centro who, through alertness, professional skill, and personal courage, averted further danger by safing the ejection seat which had, unknown to LT Sein, become partially armed.

Well done!

Anymouse

I COULDN'T believe what happened to me recently. I had a near-miss with an aircraft that had no business being anywhere near me. A good outside scan helped avoid the midair, but it still scared me. Here's what happened.

There I was on an instrument approach to Homeplate, and three things happened almost simultaneously. I reached 700 feet on final (minimums), broke out at the same time, and before I even had time to gloat, there was some yo-yo in a P-3 crossing left to right in front of me. (Visibility was good.)

Fortunately, he was just far enough in front of me that I missed him, but that stinger on his tail passed closer than 500 feet. He was below the overcast all right, but I'd guess no more than 100-150 feet.

If I thought I had had a near-miss, it was nothing compared to the aircraft behind me. No more than 5 minutes later, this aircraft, on the same approach, actually had to take evasive action when he broke out to avoid the same †+$%&*! P-3.

There was all kinds of jumping up and down, arm waving, dire threats, and references to his ancestry when the two of us had an audience with the Ops boss. We found out the P-3 had a local clearance to maintain VFR while conducting a postmaintenance test flight.

There were several questions that

were asked but never answered, like:

- How come the P-3 was cleared to conduct a VFR test flight around the field?
- How come he was tooling around the approach end of the field?
- How come there was no advisory given to inbound IFR traffic about him?
- How come he wasn't advised there was inbound traffic?

Furiousmouse

Hooey, boy! The least that can be said is that some extremely poor headwork was shown. Even though this near-miss occurred outside the 48 contiguous states, there is no justification for it. No matter where, there is an Ops boss and some controllers who need to review OPNAVINST 3710.7H concerning special VFR and control areas right now. There's also a squadron CO and a few pilots who need to do the same. It is not necessary to stretch the imagination too far to realize either aircraft shooting an approach could have had a midair with the P-3. Now cut that out!

I Got It! You Take It!

THE late night operational flight was behind schedule and the P-3 flight crew was in a hurry to make its launch envelope. Condition five was reported set while taxiing to the runway. After takeoff, while enroute to station, the PPC left the right seat to discuss tactics and determine the system status of the "tube."

The senior enlisted aircrewman approached the PPC and complained that both SS1 and SS2 operators were seated when condition five was set, but were unstrapped and didn't have their helmets on. A quick conference between the TACCO and the PPC ensued with a review of aviation safety ground rules. The PPC opted to discuss this happening with the aircrew, and with supposed "safety consciousness" restored, returned to his seat.

Later, however, the PPC was completely absorbed copying a communications message; he turned to ask the pilot in the left seat a question – only to discover there was no one there! The flight engineer was

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT
PREVENT AN ACCIDENT

in his seat, positioned full back, and another pilot was standing behind the left seat, but there wasn't anyone at the controls. The P-3 was on autopilot, at 500 feet, at night.

The PPC took control quickly and hollered for the pilot who had been flying and left his seat without so much as by your leave. Neither the flight engineer nor the replacement pilot seemed to be aware of the imminent danger. This aircrew had been one of the most seasoned crews in the squadron, but their actions were potentially catastrophic. The fact that they had flown together less than any other crew since the preceding deployment may have contributed to their laxity. This crew was an accident waiting to happen!

Teedoffmouse

Airing Complaints

NAS Conus – My station's C-1A aircraft has been downed numerous times for a hydraulic leak coming from the reservoir, which can only be corrected by removing the reservoir. It has been downed by aircrewmembers, plane captains, and the airframes shop. The aircraft's soundproofing is completely soaked with fluid and is a constant fire hazard when flying.

Maintenance control and QA have been verbally notified many times, but all they do is up the aircraft so it can keep flying without correcting the discrepancy. Maintenance control says it is needed. This has happened numerous times.

The situation is so bad that one crewmember has stopped flying, and there are others thinking the same. The situation needs an investigation team to find out why the aircraft can't be downed so it can be repaired properly. And also to see why the safety officer hasn't done anything about this problem.

Secondly, there has been a FOD regulation broken at this station. One U-11A aircraft was scheduled for flight. Before flight, the port brake was repaired. Hydraulic fluid was on the flight ramp, but it was washed down with cleaning solvent as required. Then the officer in charge instructed airframes to use Speedy Dry to clean up fluids, which is against regulations as it is considered FOD on the flight line. The pilot of the aircraft was the air operations safety officer, and nothing was said by him about the job done or it being against regulations. Why was this allowed to happen while in the presence of the safety officer? Can you find out why?

Safetymouse

An investigation conducted at Headmouse's request revealed the following information:

• *C-1A aircraft:* There have been three discrepancies noted on this aircraft concerning hydraulic leaks near the reservoir during the last 7 months. In each case, the lines/fittings were tightened and the system pressure checked with no further discrepancies noted. The last discrepancy was written several months ago and has not recurred. The soundproofing that is "completely soaked" consists of an area approximately one foot in diameter. There is no evidence of any other part of the soundproofing having any contact with any fluid. The individual who quit flying did so for personal reasons not related to this discrepancy whatsoever. The other crewmen interviewed have not indicated a desire to quit flying for any reason. In fact, there is a waiting list for those men who desire to fly but cannot due to the number of flying billets allowed. Additionally, within the department, the crewmembers perform daily turnaround inspections on this bird before each flight and all are plane captains who draw flight skins.

• *FOD regulation (Speedy Dry):* Numerous senior maintenance and operations personnel have been interviewed, and not one of them knows of any instruction prohibiting the use of Speedy Dry on the flight line. In fact, just the reverse is true. They all recommend the proper use of Speedy Dry to clean up any oil spills. NAVMAT P-5100, *Safety Precautions for Shore Activities,* dated January 1973, Chapter 4 (aviation), para 0403 (housekeeping) and para 0403.1 (spills) covers this subject, but does not mention Speedy Dry.

The investigating officer further states: "While it is realized that anything (i.e., tools, parts, regulations) can be used improperly, common sense and logic should prevail so that the cure is not worse than the illness, which in this case means: If you are going to use Speedy Dry, clean it up properly."

So there you have it; hope this opens up lines of communication so that future legitimate safety concerns can be expressed directly to those concerned.

Letters

Rog Your Emergency

FPO, New York – Approximately 1 hour into a night plane guard mission the crew of an SH-3G noted fuel fumes in the cabin. An integrity/security check was performed and JP was noted pooling on the cabin deck. The source was discovered on the overhead, portside. An emergency was declared and an immediate landing was requested.

Departure control (also plane guard control) gave an initial vector to final and directed us to switch to approach. Approach control directed the helo to return to the plane guard position and take interval on an aircraft turning final at 10 miles. Approach was briefed by the HAC that fuel was dripping into the aircraft from several locations and it was indeed an emergency. The controller replied, "Roger, sir, I'm doing what's passed to me."

Taking interval on the 10-mile aircraft, at ball acquisition the helo was turned 180 degrees out of the pattern to take interval on another aircraft. This time the controller said, "We had to slip another one in front of you."

At this point the fuel leak increased. It was flowing over hot resistors and the circuit breaker panel and was still pooling on the cabin deck. Approach control was again notified that the helicopter must land NOW and was told that the aircraft in the groove was the interval. That aircraft boltered twice. Finally, 20 minutes after the emergency declaration, the helo landed. It was found that the No. 1 engine centrifugal fuel purifier had ruptured and sprayed fuel onto the engine.

It appears that the series of events which led to the needless time lapse between the discovery of an emergency situation and the safe recovery aboard can be narrowed down to two options. Either the controllers did not have the big picture of the danger the helo was in, or they fully realized the potential of the emergency but rejected it in favor of landing fixed-wing aircraft.

CATCC was notified five times (the last three quite adamantly) of what was going on, but continued to vector the helo around behind the fixed-wing aircraft. A sweet tanker was overhead to handle any low states which might have developed. Someone in CATCC or higher deliberately jeopardized the lives of the helo crew and the aircraft for the sake of mission completion, expediency, or tempo of flight operations.

People sometimes have to be reminded that just because a helo can hover, it can't do everything. An explosion of the fuel spraying on the hot engine could have damaged the transmission or FODed the rotor head, resulting in a fiery crash at sea. Helicopter crews don't have the final option of punching out.

Name Withheld

Beware the Bite

FPO, New York – In your JUL '76 APPROACH, the story of LCDR Frye's expert airmanship ("They said it couldn't be done!") was great. He should, however, learn ground safety rules. You should *never* have any part of your body placed into the bite of the canopy, even if safety struts are installed. This kind of accident happens every so often, but if proper safety instructions are followed, chances are in a few years you'll have to look up the definition of "accident" in *Webster's*.

AMEAN Ronnie H. Tyler, USN
VA-34

• **A computer run on F-4 canopy accidents revealed that two aircrewmen (both RIOs) have managed to catch their hands in the canopy in the past 7 years. However, in both cases, the canopy was actuated down by someone other than the RIO. There were no instances where the canopy closed on its own accord. Therefore, chances for injury are truly remote in the time it took to pose and take the picture in question. Nevertheless, your basic point is valid. Whenever possible, crewmen working with the *Phantom* should keep their hands and body clear of the canopy bite to avoid inadvertent lowering of the canopy onto their body.**

Shatterproof

NAS Whidbey Island – A pilot was preflighting the starboard intake area when his plane captain, who was standing on the starboard intake, wiping the windscreen, dropped a glass bottle of *Plexiglas* cleaner. The bottle broke at the pilot's feet, sending pieces of glass over a wide area.

The glass bottle is hard to hang on to when you're wiping down the canopy with one hand and holding on with the other hand. I suggest a smaller plastic bottle (capless, squirt-type) to be used in the line area.

LT Robert A. Miller
VA-95

Who Will Speak?

San Diego, CA – I fear the future for aviators' fire protection. The times are grave for the military, but when do we call a halt to some cuts? What are the priorities? Who pays for the sacrifices?

At NAS North Island we've waged a long, losing battle. The battle has taken its toll on the firemen, and morale is at an all-time low. We are faced with further manpower

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and equipment cuts which can only lead to loss of life, property, and many dollars. We're convinced these reductions will lead to tragedy.

We've been advised that manning requirements for the MB-1 and MB-5 crash vehicles will be reduced to four and three respectively. This will reduce our rescue capability by one-half. We've been told the crash crew won't provide that service any longer. All we're supposed to do is put out the fire. Survivors trapped in the wreckage will have to work things out for themselves. That is ridiculous!

We've lost our old 0-6 and with it the capability of using CO_2 on crashes. Sure, it was old but it served a useful function. When we finished a job with it, aircraft engines didn't have to be changed, like they do after using PKP.

Also, the powers-that-be have decided we don't need our 10- and 40-ton cranes for salvage. Right now we can clear runways quickly with our cranes and slings. Without them someone will have to call Public Works to do the job. Can you imagine a crash crewman crawling on his belly to the cockpit/cabin of an inverted aircraft to tell the pilots/passengers to hold on, that Public Works has been called? It doesn't make too much sense, does it?

Further, we've been told "they" want to do away with our LARC, Land-Sea rescue vehicle. With it we can get in the water and on the way quicker than the crashboat. We've had several saves with the LARC.

These are not all of the cuts and reductions in fire, crash, and rescue capability but should be enough to illustrate that pilots, crews, and passengers chances of survival will be drastically reduced. Can we prevail on someone to see and stop this travesty of safety?

Howard E. Gillins

• Your concern for the future of quality fire protection for aviators is appreciated. Based on extensive research and tests, however, it is safe to say that pilot fire protection and rescue capability will not be impaired in the future. The Navy has just spent many man-hours and countless dollars in the study and subsequent revision of the Crash and Rescue Manual, NAVAIR 00-80R-14. The manual was written by professional crash and rescue personnel for the use of on-line firefighters. Most of your fears will be dispelled when the new manual is published in late 1976 or early 1977.

Answers to the manning requirements, of universal concern throughout the Fleet, can be found in the lead article of the WEEKLY SUMMARY No. 28-76 (4-10 July 1976).

While the LARC might be valuable in some situations, helicopters are usually quicker on scene and can provide the same services. Your CO is in the position to decide the LARC's value as a rescue vehicle.

Navy Flying Club Safety Statistics

Dayton, OH – I am a member of the Wright Patterson Aero Club here in Dayton and as such I see Air Force reports of safety recorded about Air Force Aero Clubs.

The APR '76 APPROACH had a good article, "Civilian Flying for Naval Aviators." I assume the Navy keeps records on safety for Navy and Marine sponsored Aero Clubs.

I would like to know more about aero club safety and would like to compare statistical data between Air Force Clubs and Navy Clubs in that they operate under different rules.

Would you mail me a statistical summary report of Navy aero club safety? I appreciate your help, and thanks for years of enjoyable reading from APPROACH.

Alan C. Johnson

• Contrary to your assumption, the Navy does not keep statistical records of Navy Flying Club accidents. Navy Flying Clubs are required to report all mishaps by Part 430 of NTSB regulations on NTSB form 6120.1 They send this report to the FAA, with copies to OPNAV in Washington and the Naval Safety Center. These reports are not entered into the Navy's accident computer files at the NAVSAFECEN and are routed for information only. Therefore, regrettably, there is no overall statistical summary available of Navy Flying Club safety records.

Carrot-on-a-Stick Award System?

NAS Jacksonville, FL – I feel somewhat distressed by two articles which appeared in your May edition. "Too Late, Too Hot to Survive" related the unfortunate series of events surrounding the death of an A-4 pilot who "apparently decided to stay with the aircraft as long as possible" before it became too late to eject. The aircraft subsequently crashed, and the pilot died of injuries caused when the fireball destroyed his parachute after ejecting. The courage displayed in his unsuccessful effort is certainly commendable, but the pilot is, sadly, lost. The other article pins a "Bravo Zulu" on another A-4 pilot who, although in a somewhat dissimilar situation, made a decision to stay with his aircraft in spite of rapidly depleting fuel supplies, local thunderstorms, and 20-knot tailwinds on the runway. When he successfully landed his aircraft, he "saved the Navy a valuable *Skyhawk* and avoided risk of personal injury."

I hesitate to pass judgment on the professionalism or decision processes described in either instance. I can, however, describe the impact of these articles upon me. I seriously question the "carrot-on-a-stick" award system which rewards those pilots who risk their lives during *extremis* situations in unsafe aircraft (if they survive). The others become statistics. At the same time, these two stories brought my attention to the insidious dangers involved in emergency situations, and hopefully opened the eyes of other pilots as well. In these instances, one pilot lived and one died. The results could have been different – they both could have died! But I prefer to think that they both could have lived.

LT A. Story
VP-56

• No one will argue that it is poor policy to reward a pilot who risks his life during an *extremis* situation and makes it, and then to criticize another pilot in the same circumstance who didn't make it. This is seldom the case, however, and we feel that it definitely doesn't apply in the example you cite. The pilot that died did so in an attempt to land his aircraft despite a failed engine. His action was clearly in violation of NATOPS concerning engine failure at low altitudes. The pilot awarded the BZ, on the other hand, violated no regulations. His circumstances, while certainly in *extremis*, nevertheless did not warrant ejection. It would be extremely difficult to justify leaving a perfectly good airplane just because of a thunderstorm, tailwinds, and a low fuel state. That he was able to overcome all these and successfully land the airplane, without any violation of regulations, is certainly commendatory and worthy of recognition.

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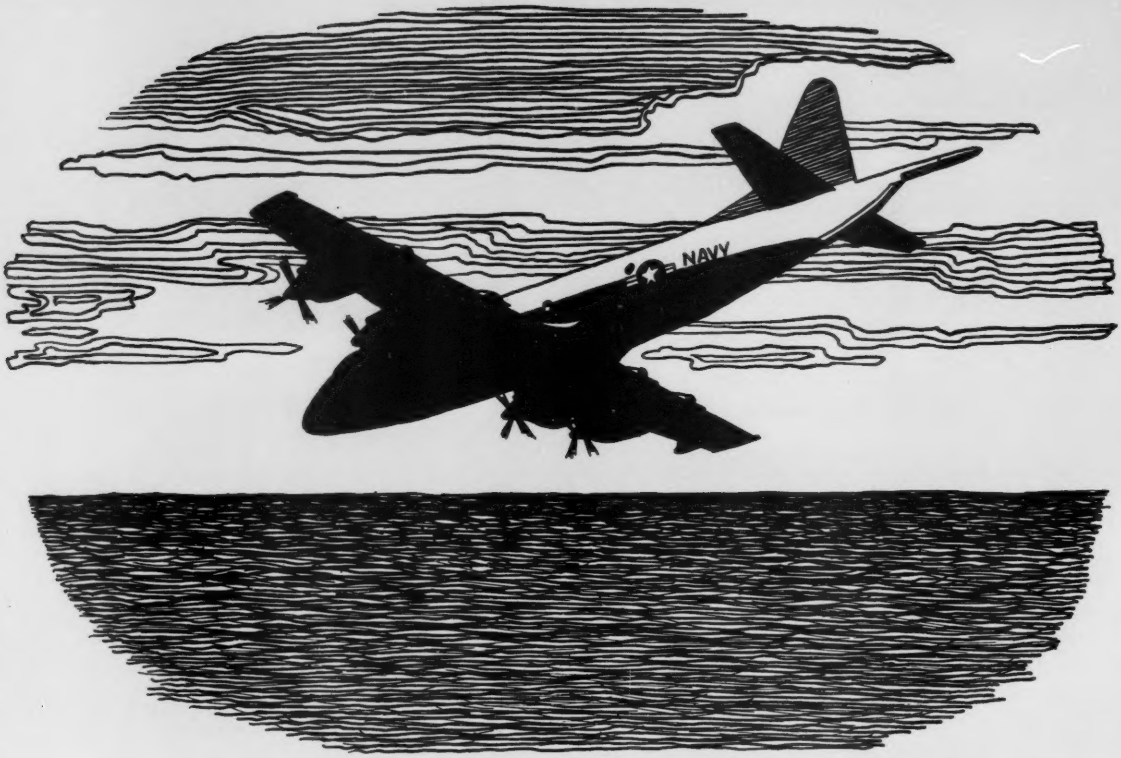
CREDITS/Our cover painting this month by Craig Kavafes shows the E-2A *Hawkeye* on station as an early warning guardian of the Fleet. The painting is reproduced through the courtesy of Grumman Aircraft Corporation, Bethpage, NY.



George does it again!

By CDR D. M. Truax
CO, VP-9

IT was a moonless night. The P-3 crew, after descending through an overcast, had leveled off at their on-station altitude of 500 feet. The autopilot was routinely engaged and radar hold was selected. "George" had it.

The copilot was flying the aircraft with "George's" help, while the PPC handled ICS and COMM and updated the tactical plotter. The flight engineer was standing behind the flight engineer's seat, preparing to relieve the second mech, when the copilot rolled into a 20-degree turn to mark a buoy.

Shortly after establishing this angle-of-bank, the flight turned to worms. "George" decided to push over. In roughly 3 or 4 seconds (or maybe 6 quick heartbeats), "George" was relieved (using the yoke disconnect button) as the *Orion* passed through 250 feet in a 1200 fpm descent.

After a recovery at 150 feet and climbout to 1500 feet, the crew let their adrenalin level settle out and started talking "what if?" For example, what if they had been at 200 feet when "George" went ape?

Fortunately, the copilot was routinely keeping one finger on the yoke autopilot disconnect button. Yet there was still a several second delay before initiating recovery while caution lights were recognized and verified by the instruments. In this case, the only thing that prevented water impact was being at 500 feet initially. That no extra time was wasted in a wild grab for the disconnect button also helped.

In conclusion, the combination of low altitude and a suicidally inclined autopilot can ruin your whole day. Pilots must maintain a vigilant scan of the gages while constantly caressing the disconnect button.

DON'T FLY WITH A COLD!

You might not hear so good tomorrow.